CLAIMS

1. A device for determining k representative of the magnitude A of an orthogonal component of a Quadrature Amplitude Modulation (QAM) symbol, including:

multi-stage binary search circuitry for conducting a multi-stage binary search for the value of A between predetermined maximum and minimum values A_{max} and A_{min}, each stage producing a single bit binary output; and

integer value construction circuitry for constructing the integer value k by juxtaposing the binary outputs from consecutive stages of the binary search,

where $W = (A_{max} - A_{min})/ n$,

n equals 2^i and i is an integer,

A_{max} is a maximum detectable level of the magnitude A,

A_{min} is a minimum detectable level of the magnitude A, and

W is the incremental level between consecutive values of the integer value k.

2. A device according to claim 1, wherein each orthogonal component sample and the predetermined maximum value A_{max} are in a floating point format comprising a mantissa and an exponent, and wherein the multi-stage binary circuitry includes exponent normalising circuitry for bit-shifting the mantissa until the exponent is identical to the exponent of the predetermined maximum value A_{max}.

3. A device according to either one of claims 1 or 2 wherein the predetermined minimum value A_{min} is zero, and the multi-stage binary search circuitry includes a first stage search element and one or more subsequent stage search elements, the first stage search

element including a bit shift block for determining the mid-point between the predetermined maximum value A_{max} and zero.

4. A device according to claim 3, wherein each subsequent stage search elements includes an adder for determining the mid-point between upper and lower output values of a preceding search element.

5. A device according to either one of claims 3 or 4, wherein the first stage search element and subsequent stage search elements each include a comparator for comparing respectively the midpoint between predetermined maximum and minimum values A_{max} and A_{min}, and the midpoint between upper and lower output values of a preceding search element, and wherein the integer value k is constructed by the integer value constructing circuitry from the outputs of the comparators.

6. A method for determining an integer value k representative of the magnitude A of an orthogonal component of a Quadrature Amplitude Modulation (QAM) symbol, the method including the steps of:

(a) conducting a multi-stage binary search for the value of A between predetermined maximum and minimum values A_{max} and A_{min}, each stage producing a single binary output; and

(b) constructing the integer value k by juxtaposing the binary outputs from consecutive stages of the binary search,

where $W = (A_{max} - A_{min})/ n$,

n equals 2^i and i is an integer,

A_{max} is a maximum detectable level of the magnitude A,

A_{min} is a minimum detectable level of the magnitude A, and

W is the incremental level between consecutive values of the integer value k.

7. A method according to claim 6 wherein, each orthogonal component sample and the predetermined maximum value A_{max} are in a floating point format comprising a mantissa and an exponent, the method further including the step of bit-shifting the mantissa until the exponent is identical to the exponent of the predetermined maximum value A_{max}.

8. A method according to either one of claims 6 or 7, wherein the predetermined minimum value A_{min} is zero, and wherein the multi-stage binary search includes a first stage and one or more subsequent stages, the first stage including conducting bit shifting to determine the mid-point between the predetermined maximum value A_{max} and zero.

9. A method according to claim 8, wherein each subsequent stage includes determining the mid-point between upper and lower output values of a preceding search stage.

10. A method according to either one of claims 8 or 9, wherein the first stage and subsequent stages each include comparing respectively the midpoint between predetermined maximum and minimum values A_{max} and A_{min}, and the midpoint between upper and lower output values of a preceding search element, and wherein the integer value k is constructed from the results of the comparisons.